

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A method of producing a glass substrate for a mask blank, in which a surface of the glass substrate is polished by the use of a polishing liquid containing abrasive grains, wherein:

the glass substrate is one of a glass substrate for a phase shift mask blank to be exposed by an ArF excimer laser, a glass substrate for a phase shift mask blank to be exposed by an F₂ excimer laser, and a glass substrate for a EUV reflective mask blank,

the surface of the glass substrate is polished so as to have a surface roughness required in exposure wavelength to be used,

the abrasive grains comprise colloidal silica abrasive grains produced by hydrolysis of an organosilicon compound, and

the polishing liquid has a pH value between 7.0 and 7.6.

2. (currently amended) A method of producing a glass substrate for a mask blank, in which a surface of the glass substrate is polished by the use of a polishing liquid containing abrasive grains, wherein:

the glass substrate is one of a glass substrate for a phase shift mask blank to be exposed by an ArF excimer laser, a glass substrate for a phase shift mask blank to be exposed by an F₂ excimer laser, and a glass substrate for a EUV reflective mask blank,

the surface of the glass substrate is polished so as to have a surface roughness required in exposure wavelength to be used, and

the polishing liquid comprises colloidal silica abrasive grains and has a pH value between 7.0 and 7.6.

3. (original) A method according to claims 1 or 2, wherein:

a content of alkali metal in the colloidal silica abrasive grains is 0.1 ppm or less.

4. (currently amended) A method of producing a glass substrate for a mask blank, comprising a polishing process of polishing a surface of the glass substrate by the use of a polishing liquid containing abrasive grains, wherein:

the glass substrate is one of a glass substrate for a phase shift mask blank to be exposed by an ArF excimer laser, a glass substrate for a phase shift mask blank to be exposed by an F₂ excimer laser, and a glass substrate for a EUV reflective mask blank,

~~the polishing liquid comprise colloidal silica abrasive grains,~~
the polishing process comprises;

a surface roughness control step of finishing the surface of the glass substrate to a surface roughness required in exposure wavelength to be used by using the polishing liquid comprising colloidal silica abrasive grains and moving a polishing member and the glass substrate relative to each other while the polishing member is pressed against the surface of the glass substrate under a predetermined pressure, and

a protrusion suppressing step, following the surface roughness control step, of using the polishing liquid comprising colloidal silica abrasive grains, controlling to a pressure lower than the predetermined pressure and suppressing occurrence of a fine convex protrusion by moving the polishing member and the glass substrate relative to each other.

~~the surface roughness control step and the protrusion suppressing step constitute a series of steps in the polishing process and the protrusion suppressing step is carried out immediately before the end of the polishing process.~~

5. (original) A method according to claim 4, wherein:

the pressure applied to the substrate in the protrusion suppressing step is 100 g/cm² or less.

6.-8. (cancelled)

9. (previously presented) A method of producing a mask blank, wherein:

a thin film for causing an optical change in exposure light is formed on a principal surface of the glass substrate produced by the method according to any one of claims 1, 2 and 4.

10. (original) A method of producing a transfer mask, wherein:
the thin film of the mask blank produced by the method according to claim 9 is patterned to form a thin film pattern on the glass substrate.

11.-14. (cancelled)

15. (previously presented) A method according to claim 4, wherein:
the polishing rate in the protrusion suppressing step is 0.12 $\mu\text{m}/\text{min}$ or less.

16. (new) A method according to claim 4, wherein:
the protrusion suppressing step is carried out successively after the surface roughness control step.

17. (new) A method according to any one of claims 1, 2 and 4, wherein:
the surface roughness is 0.2 nm or less in root-mean-square surface roughness (RMS).

18. (new) A method according to any one of claims 1, 2 and 4, wherein:
a defect of the surface is detected by using a defect inspection system comprising laser interference confocal optics after the polishing.

19. (new) A method of producing a glass substrate for a mask blank, comprising a polishing process of polishing a surface of the glass substrate by the use of a polishing liquid containing abrasive grains, wherein:

the method further comprises a defect detecting step of detecting a defect of the surface by using a defect inspection system comprising laser interference confocal optics after the polishing process,

the glass substrate is one of a glass substrate for a phase shift mask blank to be exposed by an ArF excimer laser, a glass substrate for a phase shift mask blank to be exposed by an F_2 excimer laser, and a glass substrate for a EUV reflective mask blank,

the polishing process is carried out so as to have a surface roughness required in exposure wavelength to be used,

the abrasive grains comprise colloidal silica abrasive grains produced by hydrolysis of an organosilicon compound, and

the polishing liquid has a pH value between 6 and 8.

20. (new) A method of producing a glass substrate for a mask blank, comprising a polishing process of polishing a surface of the glass substrate by the use of a polishing liquid containing abrasive grains, wherein:

the method further comprises a defect detecting step of detecting a defect of the surface by using a defect inspection system comprising laser interference confocal optics after the polishing process,

the glass substrate is one of a glass substrate for a phase shift mask blank to be exposed by an ArF excimer laser, a glass substrate for a phase shift mask blank to be exposed by an F₂ excimer laser, and a glass substrate for a EUV reflective mask blank,

the polishing process is carried out so as to have a surface roughness required in exposure wavelength to be used,

the polishing liquid comprises colloidal silica abrasive grains and has a pH value between 6 and 8.

21. (new) A method according to claim 4, wherein:

the polishing liquid is alkaline.